DISPLAY-POSITIONING MECHANISM

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority under 35USC 119 from Japanese Patent Application No. 2003-26928, the disclosure of which is incorporated by reference herein.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a display-positioning mechanism, for positioning of a display.

Description of the Related Art

Heretofore, various techniques have been disclosed for implementing positioning of screen portions of displays.

For example, in a technology described in Japanese Patent Application Laid-Open (JP-A) No. 2000-4087, as shown in Figure 6, an LCD 100 is mounted at an LCD holder 102, this LCD holder 102 is mounted at a circuit board 104, and the circuit board 104 is mounted at a front casing 106. Thus, relative positioning of a display aperture portion 106A of the front casing 106 and the LCD 100 is implemented.

Further, in a technology described in JP-A No. 2001-285430, as shown in Figure 7, relative positioning of an LCD member 110 and a display aperture portion 116 of a casing body 114 is implemented using a window frame member 112.

However, with the technology of JP-A No. 2000-4087, there is a disadvantage in that an offset in positioning between the LCD 100 and the display aperture portion 106A will occur if there is an offset in positioning between the LCD holder 102 and the front casing 106.

Furthermore, with the technology described in JP-A No. 2001-285430, although offsets in positioning between the display aperture portion 116 and the LCD member 110 will not occur, it is necessary to use the window frame member 112, so the number of components is increased.

SUMMARY OF THE INVENTION

The present invention has been devised in consideration of the circumstances described above, and an object of the present invention is to provide a display-positioning mechanism capable of reliably implementing relative positioning of a display aperture portion and a display, with a small number of components.

In order to achieve the above-mentioned object, according to a first aspect of the present invention, a display-positioning mechanism for positioning a display inside a casing which is structured by a first casing body and a second casing body, which is attached to the first casing body, is provided, the mechanism including: a base which is fixed in the casing; a provisional fixing member which attaches the display to the base such that the display is movable within a predetermined range relative to the base; and a positioning portion for restricting movement of the display at a time of attachment of the second casing body to the first casing body, and retaining the display at a predetermined position.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an exploded perspective view of a display-positioning mechanism relating to a first embodiment of the present invention.

Figure 2 is a sectional view, along line X–X of Figure 1, of the display-positioning mechanism of the present embodiment, which is disassembled.

Figure 3 is an enlarged sectional view, of a portion at which a stepped screw is attached, of the display-positioning mechanism of the present embodiment.

Figure 4 is a sectional view, along line X–X of Figure 1, of the display-positioning mechanism of the present embodiment, which has been assembled.

Figure 5 is a perspective view showing a variant example of an LCD unit.

Figure 6 is an exploded perspective view of an example of a telephone which employs a conventional LCD holder.

Figure 7 is an exploded perspective view of an example of a conventional mobile communications terminal device.

DETAILED DESCRIPTION OF THE INVENTION

Below, a first embodiment of a display-positioning mechanism relating to the present invention will be described with reference to the drawings.

As shown in Figures 1 and 2, a display-positioning mechanism 10 is equipped with a first casing body 12, a baseplate 14, a stepped screw 16, an LCD unit 20, and a second casing body 30.

The first casing body 12 has a rectangular bowl form, and includes a bottom face portion 12A and a side face portion 12B. A fitting protrusion frame

12C is provided along an edge of the side face portion 12B. A fitting recess frame 30C of the second casing body 30, which is described later, fits onto the fitting protrusion frame 12C.

An electrical component including various operational circuits (which is not shown) is mounted at the baseplate 14. The baseplate 14 is fixed to the first casing body 12 by unillustrated members. A reference potential terminal 14A, which is capable of maintaining a reference potential, is provided at an upper face of the baseplate 14. A screw hole 15, into which the stepped screw 16 can be screwed, is formed at an inner side of the reference potential terminal 14A.

The LCD unit 20 includes an LCD 22, a frame portion 24 and a plate-like mounting portion 26. The LCD 22 displays images based on image data. The LCD 22 is fixed inside the frame portion 24. The mounting portion 26 is integrally formed as a single component with the frame portion 24, and features resiliency.

The frame portion 24 is formed with a conductive material, structures a box-like casing body for the LCD unit 20, and includes a bottom face portion 24A, a side face portion 24B and a top face frame 24C.
A presentation frame 24D, for exposing a display region of the LCD 22, is provided at the top face frame 24C.

The stepped screw 16 includes a screw head 16A, a step portion 16B and a screw portion 16C. Grooves for a flat head screwdriver (phillips screwdriver) are formed in an upper face of the screw head 16A, and a screw thread is formed at the screw portion 16C. The step portion 16B, which is disposed between the screw head 16A and the screw portion 16C, is longer than a thickness of the mounting portion 26.

A mounting hole 26A, into which only the screw portion 16C and step portion 16B of the stepped screw 16 can be inserted, is formed in the mounting portion 26.

The screw portion 16C and step portion 16B of the stepped screw 16 are inserted into the mounting hole 26A, and the screw portion 16C is screwed into the screw hole 15. The step portion 16B has a greater diameter than the screw portion 16C, and the step portion 16B cannot be inserted into the screw hole 15. As shown in Figure 3, when the stepped screw 16 is attached to the baseplate 14, a gap S1 (in a vertical direction) is formed between the screw head 16A and the mounting portion 26 of the LCD unit 20, a gap S2 (in the screw diameter direction) is formed between the step portion 16B of the stepped screw 16 and the mounting hole 26A (the mounting portion 26) of the LCD unit 20, and a gap S3 (in the vertical direction) is formed between the baseplate 14 and the LCD unit 20. Note that, in this embodiment, vertical and horizontal directions are mentioned for the sake of convenience, but the invention is in no way limited by this.

At a time of attachment of the LCD unit 20 by the stepped screw 16, an angle θ between the mounting portion 26 and the frame portion 24 (see, e.g., Figs. 1 and 3) is set to an angle slightly smaller than 180º ($\theta 1$). When an external force acts and the angle (θ) is made greater than $\theta 1$, a force in a direction for returning the angle θ to $\theta 1$ is generated by the resiliency of the mounting portion 26.

As shown in Figures 1 and 2, the second casing body 30 has a rectangular bowl form and includes an upper face portion 30A and a side face portion 30B. The fitting recess frame 30C, which is fittable with the fitting protrusion frame

12C of the first casing body 12, is formed along an edge of the side face portion 30B.

A rectangular display aperture portion 32 is formed in the upper face portion 30A, and the LCD 22 of the LCD unit 20 is exposed through the display aperture portion 32.

Four projections 34A, 34B, 34C and 34D are formed integrally with the second casing body 30. The projections 34A, 34B, 34C and 34D protrude from the upper face portion 30A at positions which are separated by predetermined distances from respective edges of the display aperture portion 32. These projections, being formed integrally with the second casing body 30, structure a positioning portion 34 for receiving and fixing the LCD unit 20.

Each of the projections 34A, 34B, 34C and 34D is given a tapered form such that receiving the LCD unit 20 is made easier.

Below, operation of the present embodiment will be described.

First, the baseplate 14 is fixed to the first casing body 12.

Then, the screw hole 15 of the baseplate 14 and the mounting hole 26A of the LCD unit 20 are matched up, and the screw portion 16C of the stepped screw 16 is screwed into the screw hole 15. Thus, the LCD unit 20 is attached to the baseplate 14. Note that construction such that the LCD unit 20 is attached to the baseplate 14 before the baseplate 14 is fixed to the first casing body 12 is also possible.

The mounting portion 26 is electrically connected with the reference potential terminal 14A on the baseplate 14.

The LCD unit 20 is movable within a predetermined range relative to the baseplate 14, because of the gaps S1, S2 and S3 as mentioned above.

Next, the second casing body 30 is attached to the first casing body 12, from the LCD unit 20 side thereof. At this time, the LCD unit 20 is accommodated at an inner side of the positioning portion 34 (a receiving region thereof), and the fitting protrusion frame 12C of the first casing body 12 is fitted into the fitting recess frame 30C of the second casing body 30. Hence, the second casing body 30 is attached to the first casing body 12 (see Figure 4). In this attached state, movement of the LCD unit 20 in an LCD unit longitudinal direction (a horizontal direction) is restricted by the positioning portion 34. That is, positioning in this direction is achieved. At the same time, movement of the LCD unit 20, which is pushed downward by a portion of the upper face portion 30A that is disposed at the inner side of the positioning portion 34, in an LCD unit thickness direction (the vertical direction) is restricted by the resiliency of the mounting portion 26. That is, positioning in this direction is achieved.

At this time, the angle θ between the mounting portion 26 and the bottom face portion 24A of the frame portion 24 is greater than $\theta 1$.

During the attachment described above, the LCD unit 20 is in a provisionally fixed state which is movable within a limited range. That is, the LCD unit 20 is movable within the predetermined range due to the gaps S1 to S3, as mentioned above.

Accordingly, even if a positional relationship of the baseplate 14 and the second casing body 30 is provisionally offset to a certain extent, the LCD unit 20 can be moved so as to compensate for such an offset.

Therefore, it is possible to position the LCD unit 20 with high accuracy relative to the display aperture portion 32 of the second casing body 30, and

with great ease.

Because the positioning portion 34 is formed integrally with the second casing body 30, the number of components can be kept small. However, the positioning portion 34 may be formed separately from the second casing body 30 and structured for fixing to the second casing body 30 after formation.

Because of the resiliency of the mounting portion 26, the LCD unit 20 does not exhibit looseness.

When the LCD unit 20 is fixed to the baseplate 14, the mounting portion 26 can be closely contacted with the reference potential terminal 14A of the baseplate 14. Hence, it is possible to reliably maintain the reference potential at the LCD unit 20. Namely, the mounting portion 26 comprises functionality as a reference potential-receiving terminal which is capable of electrically contacting with the reference potential terminal 14A for maintaining the reference potential of the display.

As shown in Figure 5, the reference potential of the LCD unit 20 can also be maintained by mounting a conductive member 28 at the frame portion 24 separately from the mounting portion 26.

The display-positioning mechanism of the present invention is applicable to devices equipped with displays, such as, for example, digital cameras, video cameras, portable telephones, personal computers and so forth. Besides LCDs (liquid crystal displays), the displays can include plasma displays, organic electroluminescent displays (organic EL displays) and so forth.